AVIATION TEST READY

Preview sample pages

Private Pilot · Version 4 draft

These are low-resolution, watermarked preview pages from a draft of the Version 4 study guides:

Part 1 — The Airplane and the Rules (Chapters 1–8)
Part 2 — Flight Planning and Decisions (Chapters 9–17)
The complete Study Guide — all 17 chapters in one volume

This is not the full guide, and it is not a paid file.
Final pages may change. The kit is in review and is not yet on sale.

PDF and EPUB of the finished guides will be released with the kit.

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AVIATION TEST READY

AIRPLANE · ASEL

THE STUDY GUIDE

VERSION 4.0

PRIVATE PILOT

PART 1 OF 2

The Airplane and the Rules

Aerodynamics · Stalls · Systems · Instruments
Regulations · Airports · Radio



FAA Private Pilot Knowledge Test (PAR)

Parts 1 and 2 are one product · Glossary & index in each part

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AVIATION TEST READY

AIRPLANE · ASEL

THE STUDY GUIDE

VERSION 4.0

PRIVATE PILOT

PART 2 OF 2

Flight Planning and Decisions

Airspace · Weather · Reports · Weight & Balance
Performance · Navigation · Aeromedical · ADM



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AIRPLANE · ASEL

THE STUDY GUIDE

PRIVATE PILOT

VERSION 4.0

The complete guide

Aerodynamics · Systems · Instruments · Regulations
Airspace · Weather · Navigation · Aeromedical



FAA Private Pilot Knowledge Test (PAR)

Chapters 1–17 · Glossary & index

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Chapter 1. Becoming a Pilot and Meeting the Airplane

CHAPTER OBJECTIVES

Learning objectives. After studying this chapter you should be able to:

1. List the steps and eligibility rules for the private pilot certificate.
2. State student and private pilot privileges and limits.
3. Name the major parts of an airplane.
4. Relate the three axes to the controls that move the airplane about them.
5. Explain what trim tabs and flaps do.

ACS reference: PA.I.A (Pilot Qualifications). **14 CFR:** 61.83, 61.87, 61.89, 61.103, 61.109, 61.113.

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WHEN YOU'LL USE THIS

Your first lesson. Your instructor will walk around the airplane with you and name every part in this chapter, then show you each control in the air.

1.1 The Path to a Private Pilot Certificate

A **private pilot** certificate lets you fly an airplane for fun, for travel and for your own business, and carry passengers. You may not fly for hire.

Who is eligible

To be eligible for a private pilot certificate (airplane) you must (14 CFR 61.103):

- be at least **17 years old** (you may be a student pilot and solo at 16);
- read, speak, write and understand English;
- pass the knowledge test and the practical test ("checkride");
- have the required training and experience.

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2.3 Angle of Attack Is Not Pitch Attitude

Pitch attitude, flight path and angle of attack

Angle of attack is measured from the relative wind

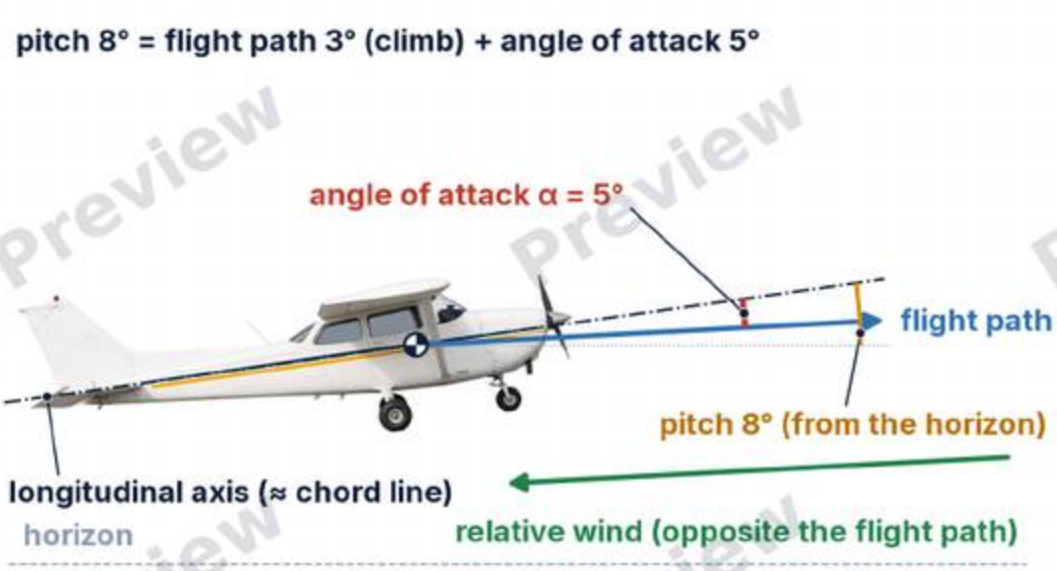


Figure 2-4. Pitch attitude is measured from the horizon; angle of attack is measured from the relative wind.

Figure 2-4:

- **Chord line**: straight line, leading edge to trailing edge.
- **Relative wind**: the airflow the wing meets, parallel and opposite to the **flight path**.
- **Angle of attack** (α): between chord line and relative wind.

Pitch attitude is the angle between the longitudinal axis and the horizon. The nose can be above the horizon while descending, as in a slow glide.

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Lift rises with angle of attack up to the **critical angle of attack** (Figure 2-5). Past it, the airflow separates, lift drops sharply and drag rises: a **stall**.

Lift grows with angle of attack, up to the critical angle

Typical light-airplane wing



Remember

A wing stalls at the same critical angle of attack at any airspeed, weight, attitude or power setting.

The stall speed changes; the critical angle does not.

Figure 2-5. Lift increases with angle of attack until the critical angle; past it, the wing stalls.

Key fact: **a wing always stalls at the same critical angle of attack**, at any airspeed, weight, attitude or power. Only the *speed* changes: heavier, or in a steep turn, it stalls faster. POH stall speeds apply only at the stated weight, wings level.

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Chapter 10. How Weather Works

CHAPTER OBJECTIVES

Learning objectives. After studying this chapter you should be able to:

1. Describe the standard atmosphere.
2. Explain pressure systems and wind.
3. Estimate cloud base from the dew point spread.
4. Explain stability.
5. Describe air masses and fronts.
6. Explain thunderstorms, wind shear, icing and fog.

ACS reference: PA.I.C (Weather Information, theory elements). **14 CFR:** 61.105(b)(10) (recognition of critical weather situations and estimating visibility). **References:** PHAK Chapter 12; AC 00-6B.

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WHEN YOU'LL USE THIS

Every weather briefing (Chapter 11). Knowing *why* weather happens lets you see a bad forecast coming before the report says so.

10.1 The Atmosphere

The standard atmosphere (selected values)

Temperature falls about 2 °C (3.5 °F) per 1,000 ft up to the tropopause.

	Altitude (ft)	Temperature (°F / °C)	Pressure (inHg)	Density ratio
	**Sea level**	59 / 15	29.92	1.000
	**5,000**	41.2 / 5.1	24.90	0.862
	**10,000**	23.3 / −4.8	20.58	0.738
	**18,000**	−5.1 / −20.6	14.94	0.563
	**20,000**	−12.3 / −24.6	13.75	0.533
	**36,089**	−69.7 / −56.5	6.68	0.297

Sky column: darker = higher. Dots: air density. Bar: temperature.

Figure 10-1. The International Standard Atmosphere.

Almost all weather happens in the lowest layer, the **troposphere** (to about 36,000 ft at mid-latitudes; its top is the **tropopause**).

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13.1 Density Altitude

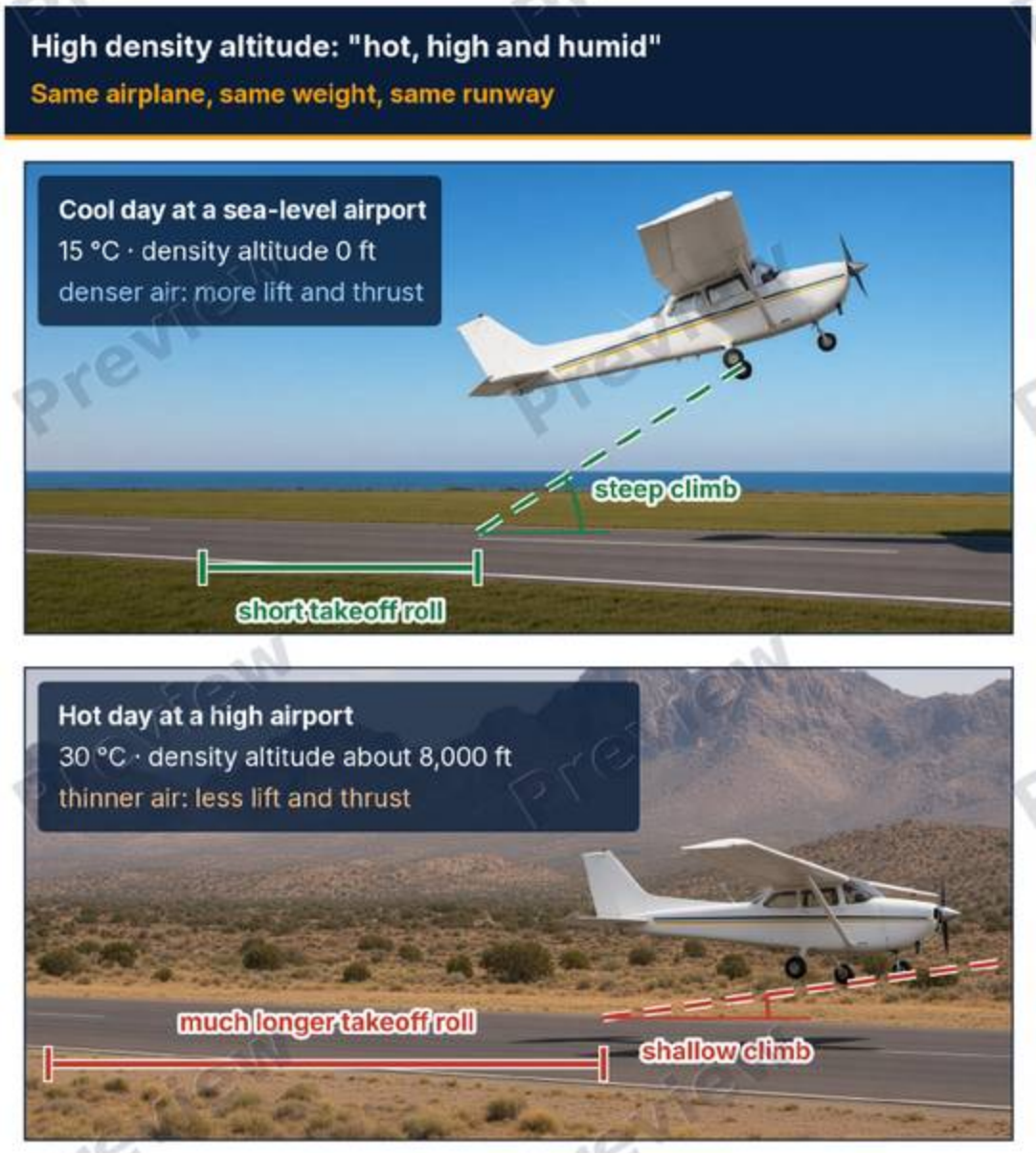


Figure 13-1. High density altitude: “hot, high and humid.” The same airplane on a cool sea-level day and on a hot day at a high airport. Thinner air means a longer takeoff roll and a flatter climb.

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Heat, height or a low altimeter setting make the air **thinner** (Chapter 10): less power, thrust and lift. **Density altitude** is the standard-atmosphere altitude with the same density: what the airplane "feels" (Figure 13-1).

High density altitude does not change the **indicated** airspeed for liftoff: indicated speed is the same, but true airspeed and groundspeed are higher, so the takeoff roll is longer.

Three steps. (1) Pressure altitude from the altimeter setting. (2) Standard temperature at that altitude. (3) Correct for the actual temperature: about **120 ft per °C** above standard. **Humidity** lowers density a little more (water vapor is lighter than dry air).

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